ACID RAIN

Acid rain occurs when emissions of SO_2 and NO_x react in the atmosphere to form acidic gases. The acidic gases react with water vapor to form acid droplets, which fall to the ground as acid deposition (more commonly known as acid rain), harming sensitive ecosystems in many areas of the country. Acid rain leads to the acidification of lakes and streams, rendering some of them incapable of supporting aquatic life. The electric power industry accounts for about 67 percent of SO_2 emissions and 19 percent of NO_x emissions in the U.S. from man-made sources.

The 1990 Clean Air Act Amendments established the Acid Rain Program to reduce the harmful effects of acid rain through reductions in emissions of SO_2 and NO_x. SO_2 reductions are achieved by a cap and trade program, which lets sources buy or sell fixed amounts of SO_2 allowances on the open market while a limit, or cap, is set on the total amount of SO_2 that can be emitted from all power plants. NO_x reductions are achieved through an emissions rate-based program.

Since the start of the Acid Rain Program in 1995, reductions of SO_2 and NO_x emissions from the power industry have contributed to significant improvements in air quality and environmental and human health. As of 2006, the program had

- Reduced SO_2 emissions by more than 6.3 million tons from 1990 levels, or about 40 percent of total power industry emissions. Compared to 1980 levels, SO_2 emissions from power plants have dropped by more than 7.9 million tons, or about 46 percent. In 2006, annual SO_2 emissions fell by over 800,000 tons from 2005 levels.
- Cut NO_x emissions by about 3 million tons from 1990 levels, so that emissions in 2006 were less than half the level anticipated without the program. Other efforts, such as the NO_x SIP Call in the East, also contributed to this reduction.
- Led to significant decreases in acid rain. For example, between the 1989-1991 and 2004-2006 time periods, sulfate deposition decreased over 30 percent in the Northeast and the Midwest, as shown in Figure 36. These reductions have led to improving water quality in lakes and streams.
- Reduced sulfate concentration in the air by about 30 percent in most regions of the East. Both the size of the affected region and magnitude of the highest concentrations have dramatically declined, with the largest decreases observed along the Ohio River Valley.

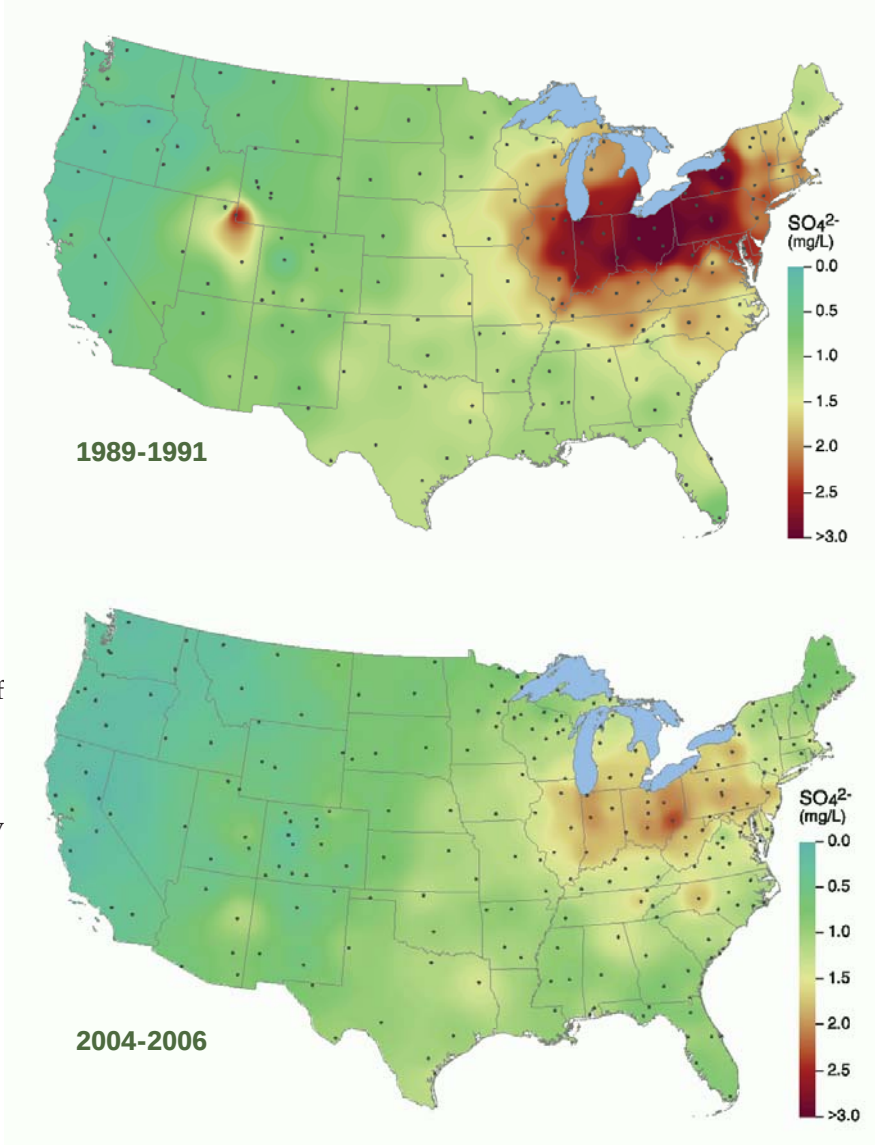

Figure 36. Three-year average precipitation of sulfate concentrations (SO_4^{2-}) in 1989-1991 and 2004-2006. Dots show monitoring locations. (Data source: National Atmospheric Deposition Program, http://nadp.sws.uiuc.edu/)